IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION

SOL IP, LLC, *Plaintiff,* v. AT&T MOBILITY LLC, *Defendant,* ERICSSON INC. and NOKIA OF AMERICA CORPORATION, *Intervenors.*	§	Case No. 2:18-cv-00526-RWS-RSP LEAD CASE
SPRINT COMMUNICATIONS COMPANY L.P., SPRINT SOLUTIONS, INC., and SPRINT SPECTRUM L.P., *Defendants,* ERICSSON INC. and NOKIA OF AMERICA CORPORATION, *Intervenors*.	§	Case No. 2:18-cv-00527-RWS-RSP CONSOLIDATED CASE
VERIZON COMMUNICATIONS INC. and CELLCO PARTNERSHIP d/b/a VERIZON WIRELESS, *Defendants,* ERICSSON INC. and NOKIA OF AMERICA CORPORATION, *Intervenors*.	§	Case No. 2:18-cv-00528-RWS-RSP CONSOLIDATED CASE

CLAIM CONSTRUCTION
MEMORANDUM AND ORDER
REGARDING "LTE B" PATENTS

On December 5, 2019, the Court held a hearing to determine the proper construction of disputed claim terms within the group of patents referred to by the parties as the "LTE B" Patents, namely United States Patents No. 8,311,031, 8,320,565, 8,320,571, 9,144,064, 9,204,438, 9,496,976, 9,603,174, 9,888,435, 10,075,946, and 10,080,204. Having reviewed the arguments

made by the parties at the hearing and in their claim construction briefing (Dkt. Nos. 206, 225 & 234),[1] having considered the intrinsic evidence, and having made subsidiary factual findings about the extrinsic evidence, the Court hereby issues this Claim Construction Memorandum and Order. *See Phillips v. AWH Corp.*, 415 F.3d 1303, 1314 (Fed. Cir. 2005) (en banc); *Teva Pharm. USA, Inc. v. Sandoz, Inc.*, 135 S. Ct. 831, 841 (2015).

[1] Citations to documents (such as the parties' briefs and exhibits) in this Claim Construction Memorandum and Order refer to the page numbers of the original documents rather than the page numbers assigned by the Court's electronic docket unless otherwise indicated.

TABLE OF CONTENTS

I. BACKGROUND

Plaintiff Sol IP, LLC ("Plaintiff" or "Sol") has alleged patent infringement by Defendants AT&T Mobility LLC, Sprint Communications Co. LP, Sprint Solutions, Inc., Sprint Spectrum LP, and Cellco Partnership d/b/a Verizon Wireless ("Defendants"). At least for purposes of these claim construction proceedings, the parties use "Defendants" to also include Intervenor Ericsson Inc. (Dkt. No. 176 at 2; Dkt. No. 205 at 1 n.1) and Intervenor Nokia of America Corporation (*see* Dkt. No. 240; *see also* Dkt. No. 243, Nov. 18, 2019 Order).

Pursuant to the Court's September 9, 2019 Order (Dkt. No. 173), Plaintiff grouped the asserted patents into three groups, designated "LTE A" (or "LTE I"), "LTE B" (or "LTE II") and "WiFi." Dkt. No. 202. The present Claim Construction Memorandum and Order addresses the "LTE B" patents. These are United States Patents No. 8,311,031 ("the '031 Patent"), 8,320,565 ("the '565 Patent"), 8,320,571 ("the '571 Patent"), 9,144,064 ("the '064 Patent"), 9,204,438 ("the '438 Patent"), 9,496,976 ("the '976 Patent"), 9,603,174 ("the '174 Patent"), 9,888,435 ("the '435 Patent"), 10,075,946 ("the '946 Patent"), and 10,080,204 ("the '204 Patent") (Dkt. No. 206, Exs. B1–B10).

Plaintiff submits that "[t]hese patents concern cellular communications, in particular communications between base stations and mobile devices." Dkt. No. 206 at 2. In particular, Plaintiff submits that the LTE B patents relate to "cell search," which is "the process of searching a cell's transmissions for synchronization signals that allow the user equipment to synchronize its timing and get identifying information for the base station it is communicating with." *Id.* Plaintiff asserts that "[t]he cellular communication patents in this case relate to technologies incorporated into 3GPP's Long Term Evolution or LTE standards, also known as 4G." *Id.*

Shortly before the start of the December 5, 2019 hearing, the Court provided the parties with preliminary constructions with the aim of focusing the parties' arguments and facilitating discussion. Those preliminary constructions are noted below within the discussion for each term.

II. LEGAL PRINCIPLES

"It is a 'bedrock principle' of patent law that 'the claims of a patent define the invention to which the patentee is entitled the right to exclude.'" *Phillips*, 415 F.3d at 1312 (quoting *Innova/Pure Water Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). Claim construction is clearly an issue of law for the court to decide. *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 970–71 (Fed. Cir. 1995) (en banc), *aff'd*, 517 U.S. 370 (1996). "In some cases, however, the district court will need to look beyond the patent's intrinsic evidence and to consult extrinsic evidence in order to understand, for example, the background science or the meaning of a term in the relevant art during the relevant time period." *Teva*, 135 S. Ct. at 841 (citation omitted). "In cases where those subsidiary facts are in dispute, courts will need to make subsidiary factual findings about that extrinsic evidence. These are the 'evidentiary underpinnings' of claim construction that we discussed in *Markman*, and this subsidiary factfinding must be reviewed for clear error on appeal." *Id.* (citing *Markman v. Westview Instruments, Inc*, 517 U.S. 370 (1996)).

To determine the meaning of the claims, courts start by considering the intrinsic evidence. *See Phillips*, 415 F.3d at 1313; *see also C.R. Bard, Inc. v. U.S. Surgical Corp.*, 388 F.3d 858, 861 (Fed. Cir. 2004); *Bell Atl. Network Servs., Inc. v. Covad Commc'ns Group, Inc.*, 262 F.3d 1258, 1267 (Fed. Cir. 2001). The intrinsic evidence includes the claims themselves, the specification, and the prosecution history. *See Phillips*, 415 F.3d at 1314; *C.R. Bard*, 388 F.3d at 861. Courts give claim terms their ordinary and accustomed meaning as understood by one of ordinary skill in

the art at the time of the invention in the context of the entire patent. *Phillips*, 415 F.3d at 1312–13; *accord Alloc, Inc. v. Int'l Trade Comm'n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003).

The claims themselves provide substantial guidance in determining the meaning of particular claim terms. *Phillips*, 415 F.3d at 1314. First, a term's context in the asserted claim can be very instructive. *Id.* Other asserted or unasserted claims can aid in determining the claim's meaning because claim terms are typically used consistently throughout the patent. *Id.* Differences among the claim terms can also assist in understanding a term's meaning. *Id.* For example, when a dependent claim adds a limitation to an independent claim, it is presumed that the independent claim does not include the limitation. *Id.* at 1314–15.

"[C]laims 'must be read in view of the specification, of which they are a part.'" *Id.* at 1315 (quoting *Markman*, 52 F.3d at 979). "[T]he specification 'is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.'" *Phillips*, 415 F.3d at 1315 (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *accord Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002). This is true because a patentee may define his own terms, give a claim term a different meaning than the term would otherwise possess, or disclaim or disavow the claim scope. *Phillips*, 415 F.3d at 1316. In these situations, the inventor's lexicography governs. *Id.* The specification may also resolve the meaning of ambiguous claim terms "where the ordinary and accustomed meaning of the words used in the claims lack sufficient clarity to permit the scope of the claim to be ascertained from the words alone." *Teleflex*, 299 F.3d at 1325. But, "[a]lthough the specification may aid the court in interpreting the meaning of disputed claim language, particular embodiments and examples appearing in the specification will not generally be read into the claims." *Comark Commc'ns, Inc. v. Harris Corp.*, 156 F.3d 1182, 1187 (Fed. Cir. 1998)

(quoting *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988)); *accord Phillips*, 415 F.3d at 1323.

The prosecution history is another tool to supply the proper context for claim construction because a patent applicant may also define a term in prosecuting the patent. *Home Diagnostics, Inc. v. Lifescan, Inc.*, 381 F.3d 1352, 1356 (Fed. Cir. 2004) ("As in the case of the specification, a patent applicant may define a term in prosecuting a patent."). "[T]he prosecution history (or file wrapper) limits the interpretation of claims so as to exclude any interpretation that may have been disclaimed or disavowed during prosecution in order to obtain claim allowance." *Standard Oil Co. v. Am. Cyanamid Co.*, 774 F.2d 448, 452 (Fed. Cir. 1985).

Although extrinsic evidence can be useful, it is "less significant than the intrinsic record in determining the legally operative meaning of claim language." *Phillips*, 415 F.3d at 1317 (citations and internal quotation marks omitted). Technical dictionaries and treatises may help a court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but technical dictionaries and treatises may provide definitions that are too broad or may not be indicative of how the term is used in the patent. *Id.* at 1318. Similarly, expert testimony may aid a court in understanding the underlying technology and determining the particular meaning of a term in the pertinent field, but an expert's conclusory, unsupported assertions as to a term's definition are entirely unhelpful to a court. *Id.* Generally, extrinsic evidence is "less reliable than the patent and its prosecution history in determining how to read claim terms." *Id.*

The Supreme Court of the United States has "read [35 U.S.C.] § 112, ¶ 2 to require that a patent's claims, viewed in light of the specification and prosecution history, inform those skilled in the art about the scope of the invention with reasonable certainty." *Nautilus, Inc. v. Biosig*

Instruments, Inc., 134 S. Ct. 2120, 2129 (2014). "A determination of claim indefiniteness is a legal conclusion that is drawn from the court's performance of its duty as the construer of patent claims." *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1347 (Fed. Cir. 2005) (citations and internal quotation marks omitted), *abrogated on other grounds by Nautilus*, 134 S. Ct. 2120.

III. THE PARTIES' STIPULATED TERMS

The parties submitted in their September 11, 2019 P.R. 4-3 Joint Claim Construction and Prehearing Statement that "[t]here are no currently agreed constructions." Dkt. No. 176 at 2.

IV. CONSTRUCTION OF DISPUTED TERMS IN THE '031, '976, AND '204 PATENTS

The '031 Patent, titled "Cell Search Method, Forward Link Frame Transmission Method, Apparatus Using the Same and Forward Link Frame Structure," issued on November 13, 2012, and bears an earliest priority date of July 25, 2006. The Abstract of the '031 Patent states:

> A method of and an apparatus therefor searching a cell in a mobile station of a communication system in which a plurality of cells are grouped into a plurality of cell groups, and each cell group includes at least two cells. The method includes detecting a primary synchronization signal and a secondary synchronization signal from a received signal, and identifying a cell based on a combination of the primary synchronization signal and the secondary synchronization signal. The secondary synchronization signal is related to the cell group to which the mobile station belongs and the primary synchronization signal is related to the cell to which the mobile station belongs within the cell group.

The '976 Patent and the '204 Patent resulted from continuations based on the '031 Patent, and Plaintiff submits that these three patents "share a substantially similar specification." Dkt. No. 206 at 4. Defendants submit that these patents "share an identical specification." Dkt. No. 225 at 2.

(B)A. "cell search" Preambles

"method of performing cell search in a mobile station of a wireless communication system" ('031 Patent, Claim 1)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Preamble is not limiting; Plain and ordinary meaning	Preamble is limiting; "method in a mobile station of a wireless communication system for obtaining system timing of the base station having the largest reception signal and a cell identifier"
"apparatus for performing cell search in a wireless communication system" ('031 Patent, Claim 8)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Preamble is not limiting; Plain and ordinary meaning	Preamble is limiting; "apparatus in a wireless communication system for obtaining system timing of the base station having the largest reception signal and a cell identifier"

Dkt. No. 176-1 at 29–30; Dkt. No. 206 at 5; Dkt. No. 225 at 3; Dkt. No. 253-2 at 1 & 4.

Shortly before the start of the December 5, 2019 hearing, the Court provided the parties with the following preliminary construction for both of these disputed terms: "Not limiting."

(1) The Parties' Positions

Plaintiff argues that "Defendants' position fails at the outset because the preambles are not limiting." Dkt. No. 206 at 6. Plaintiff also argues that "nothing in the claims or specification states that using the base station with 'the largest reception signal' is a required or even an intended goal of the invention." *Id.*

Defendants respond that "[t]he preambles provide antecedent basis and are necessary to understand limitations in the claim bodies," and "only Defendants' construction faithfully captures the specification's explicit definition of 'cell search.'" Dkt. No. 225 at 3. Defendants argue that "Sol IP now seeks improperly to excise cell search—the heart of the patent's alleged 'present invention'—from the claims." *Id.* at 4.

Plaintiff replies that "nothing suggests the patentee was seeking to redefine 'cell search.'" Dkt. No. 234 at 2. Plaintiff also cites extrinsic evidence that Plaintiff argues "clearly distinguishes between cell search (synchronization with a cell) and cell selection (finding 'a suitable cell')." *Id.* at 3 (citing Dkt. No. 206-12, Ericsson LTE L13 Radio Network Functionality Student Book at 100–02); *see id.* at 2–3. Finally, Plaintiff reiterates that "cell search" is not limiting because "Defendants cannot show that limiting the claims to 'cell search' is necessary to understand them." *Id.* at 3.

At the December 5, 2019 hearing, Defendants argued that finding the preamble limiting as to cell search is particularly appropriate because the patentee used the term "cell search" in a special way in these patents. *See, e.g.,* '031 Patent at 1:39–44, 2:14–27 & 41:42–49.

(2) Analysis

"In general, a preamble limits the invention if it recites essential structure or steps, or if it is 'necessary to give life, meaning, and vitality' to the claim." *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (quoting *Pitney Bowes, Inc. v. Hewlett-Packard Co.*, 182 F.3d 1298, 1305 (Fed. Cir. 1999)); *see, e.g.*, *Eaton Corp. v. Rockwell Int'l Corp.*, 323 F.3d 1332, 1339 (Fed. Cir. 2003) ("When limitations in the body of the claim rely upon and derive antecedent basis from the preamble, then the preamble may act as a necessary component of the claimed invention."); *C.W. Zumbiel Co. v. Kappos*, 702 F.3d 1371, 1385 (Fed. Cir. 2012)

(finding preambles limiting because "'containers' as recited in the claim body depend on 'a plurality of containers' in the preamble as an antecedent basis"). "Conversely, a preamble is not limiting 'where a patentee defines a structurally complete invention in the claim body and uses the preamble only to state a purpose or intended use for the invention.'" *Catalina*, 289 F.3d at 808 (quoting *Rowe v. Dror*, 112 F.3d 473, 478, 42 USPQ2d 1550, 1553 (Fed. Cir. 1997)).

Also, "the purpose or intended use of the invention . . . is of no significance to claim construction . . . ." *See Pitney Bowes*, 182 F.3d at 1305. This principle has sometimes been characterized as "the presumption against reading a statement of purpose in the preamble as a claim limitation." *Marrin v. Griffin*, 599 F.3d 1290, 1294–95 (Fed. Cir. 2010); *see Allen Eng'g Corp. v. Bartell Indus.*, 299 F.3d 1336, 1346 (Fed. Cir. 2002) ("Generally, the preamble does not limit the claims."); *see also Acceleration Bay, LLC v. Activision Blizzard Inc.*, 908 F.3d 765, 769–71 (Fed. Cir. 2018) (in preamble reciting "[a] computer network for providing an information delivery service for a plurality of participants," finding "information delivery service" to be non-limiting because it "merely describe[s] intended uses for what is otherwise a structurally complete invention").

Claims 1 and 8 of the '031 Patent recite (emphasis added):

> 1. A method *of performing cell search* in a mobile station of *a wireless communication system*, the method comprising:
>
> searching a primary synchronization sequence (PSS) carrying partial information of a cell identification, wherein the PSS is one of a plurality of different PSSs that *the wireless communication system* employs,
>
> searching at least one secondary synchronization sequence (SSS) carrying remaining information of the cell identification, and
>
> identifying a cell ID using the PSS and the at least one SSS,
>
> wherein the PSS is repeatedly disposed in at least two symbols in a frame, and different SSSs are disposed in at least two symbols in the frame.
>
> * * *

> 8. An apparatus *for performing cell search* in a *wireless communication system*, the apparatus comprising:
>
> a controller configured to identify a cell ID using a primary synchronization sequence (PSS) carrying partial information of a cell identification and at least one secondary synchronization sequence (SSS) carrying remaining information of the cell identification,
>
> wherein the PSS is one of a plurality of different PSSs that *the wireless communication system* employs, and the PSS is repeatedly disposed in at least two symbols in a frame, and different SSSs are disposed in at least two symbols in the frame.

The "wireless communication system" terms derive antecedent basis from the preambles. *See Convolve, Inc. v. Compaq Computer Corp.*, 812 F.3d 1313, 1321 (Fed. Cir. 2016) (noting a "reference to 'the processor,' referring back to the 'a processor' recited in preamble"). In some cases, preambles can be limiting where such terms are "defined in greater detail in the preamble." *Proveris Scientific Corp. v. Innovasystems, Inc.*, 739 F.3d 1367, 1373 (Fed. Cir. 2014) ("The phrase 'the image data' clearly derives antecedent basis from the 'image data' that is defined in greater detail in the preamble as being 'representative of at least one sequential set of images of a spray plume.'"). Further, preambles can be limiting where they "provide antecedent basis for and are necessary to understand positive limitations in the body of claims." *Pacing Techs., LLC v. Garmin Int'l, Inc.*, 778 F.3d 1021, 1024 (Fed. Cir. 2015).

Nonetheless, "that [a] phrase in the preamble . . . provides a necessary structure for [the] claim . . . does not necessarily convert the entire preamble into a limitation, particularly one that only states the intended use of the invention." *TomTom Inc. v. Adolph*, 790 F.3d 1315, 1323 (Fed. Cir. 2015); *see also id.* ("It was therefore error for the district court to use an antecedent basis rationale to justify converting this independent part of the preamble into a new claim limitation."); *Georgetown Rail Equip. Co. v. Holland L.P.*, 867 F.3d 1229, 1234, 1236–38 (Fed. Cir. 2017) (preamble language "system for inspecting a railroad track bed, including the railroad track, to be mounted on a vehicle for movement along the railroad track" not limiting as to "to be mounted on

a vehicle for movement along the railroad track," even though "railroad track bed" provided antecedent basis for limitations in body of claim); *Marrin*, 599 F.3d at 1294–95 ("[T]he mere fact that a structural term in the preamble is part of the claim does not mean that the preamble's statement of purpose or other description is also part of the claim.").

Here, the preambles do not further define the "wireless communication system," and the "performing cell search" language in the preambles is merely "descriptive" of the limitations set forth in the body of the claim. *See IMS Tech., Inc. v. Haas Automation, Inc.*, 206 F.3d 1422, 1434 (Fed. Cir. 2000) ("The phrase 'control apparatus' in the preamble merely gives a descriptive name to the set of limitations in the body of the claim that completely set forth the invention."); *see also Deere & Co. v. Bush Hog, LLC*, 703 F.3d 1349, 1358 (Fed. Cir. 2012) ("[I]f the body of the claim describes a structurally complete invention, a preamble is not limiting where it 'merely gives a name' to the invention, extols its features or benefits, or describes a use for the invention.") (quoting *Catalina*, 289 F.3d at 809).

In some cases, disclosures in the specification can demonstrate that preamble language is limiting. *See Proveris*, 739 F.3d at 1372 ("[T]he preamble may be construed as limiting when it recites particular structure or steps that are highlighted as important by the specification.") (citation omitted); *see id.* at 1373. Defendants cite various disclosures in the specification regarding cell searching. *See, e.g.*, '031 Patent at Abstract, 2:33–38 ("The present invention provides a synchronization channel structure and a forward link frame so that a search process for an initial cell by a mobile station and a search process for an adjacent cell for handover can be easily performed in an Orthogonal Frequency Division Multiplexing (OFDM) cellular system."), 10:12–17 ("A cell searching apparatus of a mobile station according to an embodiment of the present invention may be varied according to a method of allocating a synchronization channel code of the

present invention which allows the mobile station to easily search for a cell in a cellular system.") & 14:4–7 ("The present invention relates to a cell searching method . . . .").

These disclosures, however, do not warrant importing a "cell search" limitation into the bodies of the claims. Defendants urge that "[w]hen a patent thus describes the features of the 'present invention' as a whole, this description limits the scope of the invention." *Verizon Servs. Corp. v. Vonage Holdings Corp.*, 503 F.3d 1295, 1308 (Fed. Cir. 2007); *see Corning Glass Works v. Sumitomo Elec. U.S.A., Inc.*, 868 F.2d 1251, 1256–57 (Fed. Cir. 1989) (finding the preamble "[a]n optical waveguide comprising" to be limiting because the specification demonstrated "the inventors were working on the particular problem of an effective optical communication system not on general improvements in conventional optical fibers"). As discussed above, however, Claims 1 and 8 of the '031 Patent use the term "cell search" to describe the limitations set forth in the body of each claim. In other words, Defendants' arguments based on disclosures in the specification fair no better than Defendants' arguments based on the descriptive preamble language itself.

Thus, on balance, Defendants fail to overcome "the presumption against reading a statement of purpose in the preamble as a claim limitation." *Marrin*, 599 F.3d at 1294–95; *see Arctic Cat Inc. v. GEP Power Prods., Inc.*, 919 F.3d 1320, 1328–29 (Fed. Cir. 2019) (finding "personal recreational vehicle" non-limiting in preamble reciting "power distribution module for a personal recreational vehicle" because claim body "defines a structurally complete invention" and the term "merely identifies an intended use for the claimed power distribution module").

The Court therefore hereby construes these disputed terms as set forth in the following chart:

Term	Construction
"method of performing cell search in a mobile station of a wireless communication system"	**Not limiting**
"apparatus for performing cell search in a wireless communication system"	**Not limiting**

(B)B. "cell group" and "group of cells"

"cell group" ('031 Patent, Claims 3, 4, 10, 11)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning. Alternatively, "a group of at least two cells."	"a plurality of cell identifiers specified in the wireless communications system as a group"
"group of cells" ('204 Patent, Claims 7, 13)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning.	"a plurality of cell identifiers specified in the wireless communications system as a group"

Dkt. No. 176-1 at 32 & 36; Dkt. No. 206 at 7–8; Dkt. No. 225 at 12; Dkt. No. 253-2 at 2 & 5–6.

Shortly before the start of the December 5, 2019 hearing, the Court provided the parties with the following preliminary construction for both of these disputed terms: "plurality of cells that are classified in a wireless communication system as a group."

(1) The Parties' Positions

Plaintiff argues that Defendants' proposed constructions should be rejected because "[t]he patents never refer to anything being 'specified in the wireless communications system,' whether

as a group or as anything else." Dkt. No. 206 at 9. Plaintiff also argues: "Defendants' proposed construction appears to require that the groups be expressly specified *somewhere*—apparently in some directory never mentioned in the patents—rather than being formulaically ascertainable in this manner. There is no support for such a vague and extraneous requirement." *Id.* (emphasis in original).

Defendants respond that "[t]he patents consistently use the term 'cell group' to refer to these groups in which the cell identifiers in the system are divided." Dkt. No. 225 at 12. Defendants argue: "Plaintiff's proposal of 'cell group' seeks to cover any arbitrary set of cells, regardless of whether they were specified in the wireless system as a group. This proposal is improperly broad and renders meaningless the word 'group'—indeed, 'grouping' the cells is the purpose of the alleged invention, as shown above." *Id.* (citation omitted).

Plaintiff replies that "Defendants apparently concede—as they must—that the patents never refer to any groups being 'specified in the wireless communications system,' and further that this language has no meaning for a POSITA." Dkt. No. 234 at 4. Plaintiff submits that the "groups" are not random but rather "the patent allows cell identifiers to be derived formulaically, rather than based on some directory or database never mentioned in the patents or the art." *Id.*

(2) Analysis

Claim 3 of the '031 Patent, for example, depends from Claim 1, and Claims 1 and 3 of the '031 Patent recite (emphasis added):

> 1. A method of performing cell search in a mobile station of a wireless communication system, the method comprising:
>
> searching a primary synchronization sequence (PSS) carrying partial information of a cell identification, wherein the PSS is one of a plurality of different PSSs that the wireless communication system employs,
>
> searching at least one secondary synchronization sequence (SSS) carrying remaining information of the cell identification, and
>
> identifying a cell ID using the PSS and the at least one SSS,

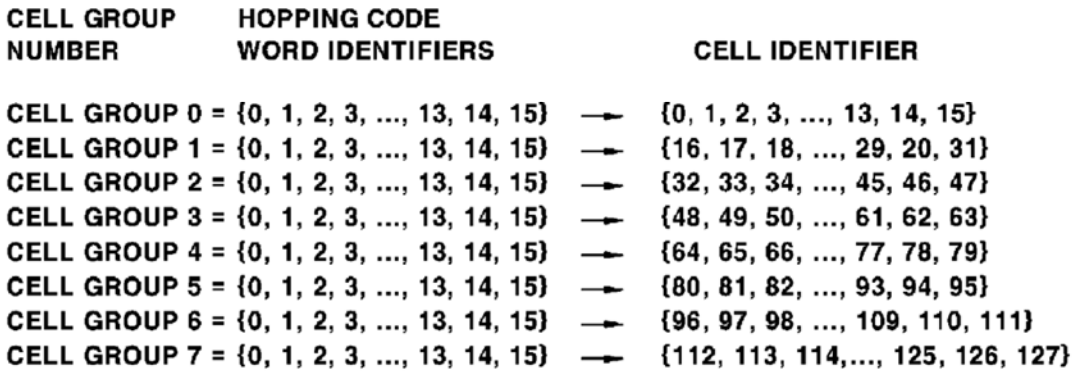
wherein the PSS is repeatedly disposed in at least two symbols in a frame, and different SSSs are disposed in at least two symbols in the frame.

* * *

3. The method of claim 1, wherein the remaining information of the cell identification is information of a cell group to which the mobile station belongs.

Both sides cite Figure 4 of the '031 Patent, which is reproduced here:

FIG. 4



Defendants argue, for example, that under Plaintiff's proposed interpretation "Sol IP could point to cells number 0, 17, and 127 in Figure 4 and call them a cell group, even though those cells have never been identified or treated as a group by the network." Dkt. No. 225 at 13.

The specification discloses:

The method of allocating a code according to the present invention introduces a two-step grouping concept which *divides the cell identifiers used in a system into more than one cell group* and divides each of the cell groups again into more than one cell sub-group.

* * *

FIG. 4 shows an example in which there is one cell identifier per cell sub-groups in the second method of allocating a code. This case does not depart from the scope of the present invention. For convenience, the case illustrated in FIG. 4 is referred to as a "fourth method of allocating a code."

> According to the fourth method of allocating a code, the number of the cell identifiers can be allocated to be a multiplication of the number of the primary synchronization channel sequences (*cell groups*) and the number of the hopping code words of the secondary synchronization channel.
>
> For example, when the total number of the cell identifiers is 128, each cell identifier can be expressed as a combination of 8 primary synchronization channel sequences and 16 hopping code words of the secondary synchronization channel (hopping code word identifiers) (that is, 128=8x16).
>
> In this case, *all cell identifiers are classified into 8 groups* according to the primary synchronization channel sequences and each group is comprised of 16 cell identifiers. *Each group (cell groups) is specified by each different primary synchronization channel sequence* and the cell identifiers included in each group can be allocated to be one-to-one mapped to hopping code words of the secondary synchronization channel (hopping code word identifiers).
>
> * * *
>
> Ultimately, a combination of the sequence numbers of the primary synchronization channel and the hopping code word identifiers of the secondary synchronization channel obtains cell identifiers.

'031 Patent at 10:29–33, 11:65–12:21 & 12:46–49 (emphasis added).

These disclosures explain that a "system" can include cells that can be "divide[d]" into "cell groups." *Id.* at 10:29–33. Defendants' proposed interpretation is therefore consistent with the specification. Further, Plaintiff's own expert opines that "the patents disclose examples of being 'divided into [] cell groups,' which a POSITA [(person of ordinary skill in the art)] would recognize does not result in arbitrary groupings." Dkt. No. 208-2, Oct. 11, 2019 Wells Rebuttal Decl. at ¶ 98.

To address Plaintiff's concern that Defendants' proposal of "specified" might be interpreted as requiring a distinct directory or database, the Court presented the parties with a preliminary construction of the disputed terms as meaning (emphasis added): "plurality of cells that are *classified* in a wireless communication system as a group." At the December 5, 2019 hearing, Defendants were amenable to the Court's preliminary construction. Plaintiff expressed

concern that the word "classified" might be construed or misconstrued by experts at later stages of this litigation. Plaintiff proposed that the Court should replace "classified" with "used." Defendants replied that whereas "used" is vague, "classified" is sufficiently clear and is supported by the specification. *See* '031 Patent at 11:65–12:21. On balance, the Court finds that "classified" is appropriate.

The Court therefore hereby construes **"cell group"** and **"group of cells"** to mean **"plurality of cells that are classified in a wireless communication system as a group."**

(B)C. "synchronization sequence" Terms

"primary synchronization sequence (PSS) carrying partial information of a cell identification" ('031 Patent, Claims 1, 8)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning Alternatively, "primary synchronization sequence (PSS) carrying a portion of a cell identification"	"primary synchronization sequence (PSS) carrying cell group ID"
"secondary synchronization sequence (SSS) carrying remaining information of the cell identification" ('031 Patent, Claims 1, 8)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning. Alternatively, "secondary synchronization sequence (SSS) carrying the rest of the cell identification"	"secondary synchronization sequence (SSS) carrying cell ID within a cell group"

"a first indicator is identified based on the first primary synchronization sequence" ('976 Patent, Claim 9)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning. Alternatively, "a first indicator is identified using the first primary synchronization sequence"	"an indicator of cell group ID is identified based on the first primary synchronization sequence"
"a second indicator is identified based on the first secondary synchronization sequence" ('976 Patent, Claim 9)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning. Alternatively, "a second indicator is identified using the first secondary synchronization sequence"	"an indicator of cell ID within a cell group is identified based on the first secondary synchronization sequence"
"wherein the remaining information of the cell identification is information of a cell group to which the mobile station belongs" ('031 Patent, Claims 3, 10)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning, where "cell group" has the meaning proposed by Sol IP.	Indefinite
"wherein the partial information is information to identify a cell within the cell group" ('031 Patent, Claims 4, 11)	
Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning, where "cell group" has the meaning proposed by Sol IP.	Indefinite

Dkt. No. 176-1 at 27–35; Dkt. No. 206 at 9–10; Dkt. No. 225 at 7 & 11; Dkt. No. 253-2 at 1–4.

Shortly before the start of the December 5, 2019 hearing, the Court provided the parties with the following preliminary constructions:

Term	Preliminary Construction
"primary synchronization sequence (PSS) carrying partial information of a cell identification"	"primary synchronization sequence (PSS) carrying a portion of information that identifies a cell"
"secondary synchronization sequence (SSS) carrying remaining information of the cell identification"	"secondary synchronization sequence (SSS) carrying the remainder of the information that identifies the cell"
"a first indicator is identified based on the first primary synchronization sequence"	Plain meaning
"a second indicator is identified based on the first secondary synchronization sequence"	Plain meaning
"wherein the remaining information of the cell identification is information of a cell group to which the mobile station belongs"	Plain meaning (Not indefinite)
"wherein the partial information is information to identify a cell within the cell group"	Plain meaning (Not indefinite)

(1) The Parties' Positions

Plaintiff argues that Defendants' proposed constructions should be rejected because "the PSS could provide group information, member information, or some partial combination of the two, with the SSS providing the rest of the information." Dkt. No. 206 at 11. Plaintiff urges that Defendants' proposals improperly import limitations from certain disclosed embodiments and, moreover, exclude other disclosed embodiments. *Id.* Further, Plaintiff points to dependent Claims 3, 4, 10, and 11 of the '031 Patent, arguing that "defendants' proposed constructions of the base claims would make it *logically impossible* to satisfy the dependent claims." *Id.* at 12 (emphasis in original).

Defendants respond that "[t]he specification of the Cell Search Patents mandates that the claimed 'primary synchronization signal' ('PSS') carries the cell group ID and the claimed 'secondary synchronization signal' ('SSS') carries the cell ID within the group." Dkt. No. 225 at 7. Defendants argue: "There is no disclosure of any kind suggesting that the inventors were in possession of an invention that used the SSS to identify the cell group and the PSS to identify the Cell ID within the group. Construing these terms otherwise, as Sol IP urges, would bestow claim scope that exceeds the specifications' written descriptions and render them indefinite." *Id.* at 8.

Further, Defendants argue that "[w]here, as here, the totality of the specification compels a specific construction of a term in the independent claim, a dependent claim cannot trump the totality of the specification and broaden the independent claim's scope," and "[t]he dependent claims relied upon by Sol IP were added by amendment during prosecution." *Id.* at 9. Finally, as to the "wherein" terms, Defendants respond that "Claims 3, 4, 10, and 11 are indefinite because they contradict the proper scope of the independent claims," which "requires that the PSS identifies the cell group and the SSS identifies the cell ID within the group." *Id.* at 11.

Plaintiff replies that "Defendants dismiss the dependent claims as added during prosecution—ignoring that they were added *at the same time* as the independent claims, making their probative value on the construction of those independent claims all the stronger." Dkt. No. 234 at 5 (emphasis in original). Plaintiff also argues that "the specification teaches the embodiments addressed by the dependent claims." *Id.* at 5–6.

(2) Analysis

Turning first to the "indicator" terms, Claim 9 of the '976 Patent recites (emphasis added):

> 9. A method of generating and transmitting downlink transmission by a base station in a wireless communication system, the method comprising:
>
> generating a first primary synchronization sequence;
>
> generating a second primary synchronization sequence;

generating a first secondary synchronization sequence;

generating a second secondary synchronization sequence; and

transmitting the downlink transmission including the first and second primary synchronization sequences and the first and second secondary synchronization sequences, wherein the downlink transmission comprises a plurality of subframes sequentially arranged in time domain, each of the plurality of subframes containing a plurality of symbols sequentially arranged in time domain, wherein a first subframe in the downlink transmission includes a first symbol representing the first primary synchronization sequence, and wherein a second subframe in the downlink transmission includes a second symbol representing the first secondary synchronization sequence,

wherein *a first indicator is identified based on the first primary synchronization sequence, a second indicator is identified based on the first secondary synchronization sequence*, and a cell identifier is identified *based on* the first indicator and the second indicator,

wherein the first subframe includes a third symbol representing a second secondary synchronization sequence, the third symbol being directly adjacent to the first symbol, and wherein the second subframe includes a fourth symbol representing a second primary synchronization sequence, the fourth symbol being directly adjacent to the second symbol.

These recitals regarding a "first indicator" and a "second indicator" include no suggestion of requiring a "cell group ID" or a "cell ID." Further, although the recital that "a cell identifier is identified based on the first indicator and the second indicator" necessarily involves both the first primary synchronization sequence and the first secondary synchronization sequence, this "based on" language does not specify what information is conveyed by each sequence.

Claims 1, 3, and 4 of the '031 Patent[2] recite (emphasis added):

1. A method of performing cell search in a mobile station of a wireless communication system, the method comprising:

searching a *primary synchronization sequence (PSS) carrying partial information of a cell identification*, wherein the PSS is one of a plurality of different PSSs that the wireless communication system employs,

searching at least one *secondary synchronization sequence (SSS) carrying remaining information of the cell identification*, and

identifying a cell ID using the PSS and the at least one SSS,

wherein the PSS is repeatedly disposed in at least two symbols in a frame, and different SSSs are disposed in at least two symbols in the frame.

[2] Claims 8, 10, and 11 of the '031 Patent are similar to Claims 1, 3, and 4, respectively.

* * *

> 3. The method of claim 1, wherein the remaining information of the cell identification is information of a *cell group* to which the mobile station belongs.
>
> 4. The method of claim 3, wherein the partial information is information to identify a *cell within the cell group.*

Defendants cite authority that "a dependent claim cannot change the scope of an independent claim whose meaning is clear on its face." *Multilayer Stretch Cling Film Holdings, Inc. v. Berry Plastics Corp.*, 831 F.3d 1350, 1360 (Fed. Cir. 2016); *see N. Am. Vaccine, Inc. v. Am. Cyanamid Co.*, 7 F.3d 1571, 1577 (Fed. Cir. 1993) ("While it is true that dependent claims can aid in interpreting the scope of claims from which they depend, they are only an aid to interpretation and are not conclusive. The dependent claim tail cannot wag the independent claim dog.").

Here, independent claims 1 and 8 of the '031 Patent include no suggestion of requiring a "cell group ID" or a "cell ID." Instead, dependent claims specify that the "remaining information" and the "partial information" are cell group and cell within a group, respectively. The doctrine of claim differentiation therefore weighs against Defendants' proposed constructions. *See Phillips*, 415 F.3d at 1315 ("[T]he presence of a dependent claim that adds a particular limitation gives rise to a presumption that the limitation in question is not present in the independent claim."); *see also Wenger Mfg., Inc. v. Coating Mach. Sys., Inc.*, 239 F.3d 1225, 1233 (Fed. Cir. 2001) ("Claim differentiation, while often argued to be controlling when it does not apply, is clearly applicable when there is a dispute over whether a limitation found in a dependent claim should be read into an independent claim, and that limitation is the only meaningful difference between the two claims.").

Defendants submit that the dependent claims here at issue were added after the filing of the original patent application. *See* Dkt. No. 225-2, May 16, 2012 Response Under 37 C.F.R.

§1.111 at 2–3. Also, as to other disputed terms in the present case (*see* Dkt. No. 226 at 6 & 11), Defendants submit authority that later-added dependent claims "cannot overcome the claim scope that is unambiguously prescribed by the specification." *Cave Consulting Grp., LLC v. OptumInsight, Inc.*, 725 F. App'x 988, 995 (Fed. Cir. Mar. 21, 2018). Plaintiff replies that the patentee added these dependent claims as part of the same amendment that added the independent claims at issue. *See* Dkt. No. 225-2, May 16, 2012 Response Under 37 C.F.R. §1.111 at 2–3. Regardless, however, the doctrine of claim differentiation carries at least some weight in the present circumstances; Defendants cite no authority for disregarding the doctrine here. The Court nonetheless considers Defendants' arguments as to purported "claim scope that is unambiguously prescribed by the specification." *Cave Consulting*, 725 F. App'x at 995.

Turning to the specification, Defendants argue that "[e]very claimed embodiment requires the PSS to carry the cell group and the SSS to carry the cell ID within the group." Dkt. No. 225 at 7. Defendants highlight, for example, the following disclosure in the specification:

> The method of allocating a code according to the present invention introduces a two-step grouping concept which divides the cell identifiers used in a system into more than one cell group and divides each of the cell groups again into more than one cell sub-group.

'031 Patent at 10:29–33. This statement, however, does not specify what information is conveyed by each of a primary synchronization sequence and a secondary synchronization sequence. Further, whereas Defendants propose that the PSS carries "cell group ID" and the SSS carries "cell ID within a cell group," the specification discloses an embodiment in which the PSS may identify one cell identifier among multiple cell identifiers. *See* '031 Patent at 12:27–33. The contrary opinion of Defendants' expert—that this disclosure refers to the order in which the cell ID and cell group ID are examined (rather than which sequence carries which ID)—is unpersuasive. *See* Dkt. No. 208-3, Sept. 11, 2019 Haimovich Decl. at ¶ 64.

Defendants cite seven allocation methods disclosed in the specification. *See* '031 Patent at 10:44–13:22. Defendants urge that the first four disclosed methods should be found limiting because the claim language here at issue pertains to only the first four disclosed methods.

The specification refers to these methods as "embodiment[s]" or "example[s]" (*id.* at 10:49–51, 11:4–6, 11:24–26, 11:65–67, 12:50–51, 12:56–58 & 13:4–6), and Defendants fail to justify importing specific features of these particular embodiments into the claims. *See Phillips*, 415 F.3d 1323 ("[A]lthough the specification often describes very specific embodiments of the invention, we have repeatedly warned against confining the claims to those embodiments.").

Defendants also argue that "[t]here is no disclosure of any kind suggesting that the inventors were in possession of an invention that used the SSS to identify the cell group and the PSS to identify the Cell ID within the group." Dkt. No. 225 at 8. Although this argument may perhaps bear upon issues of enablement or written description, Defendants fail to show that this issue is relevant in the present claim construction proceedings. Defendants point to Federal Circuit authority regarding avoiding a proposed claim construction that would render a claim indefinite, *Geneva Pharm., Inc. v. GlaxoSmithKline PLC*, 349 F.3d 1373, 1384 (Fed. Cir. 2003), but the Federal Circuit stated in *Phillips* that "we have certainly not endorsed a regime in which validity analysis is a regular component of claim construction," 415 F.3d at 1327.

The Court therefore rejects Defendants' proposed constructions as to the "synchronization sequence" terms. Because Defendants' indefiniteness arguments as to dependent Claims 3, 4, 10, and 11 of the '031 Patent are premised on Defendants' proposed constructions as to the "synchronization sequence" terms, the Court also rejects Defendants' indefiniteness arguments, and no further construction is necessary as to those dependent claims.

As to the disputed terms that recite "partial information" and "remaining information," "some construction of the disputed claim language will assist the jury to understand the claims." *TQP Dev., LLC v. Merrill Lynch & Co., Inc.*, No. 2:08-CV-471, 2012 WL 1940849, at *2 (E.D. Tex. May 29, 2012) (Bryson, J., sitting by designation). As to the other disputed terms presented here, no further construction is necessary. *See O2 Micro*, 521 F.3d at 1362 ("[D]istrict courts are not (and should not be) required to construe every limitation present in a patent's asserted claims."); *see also Finjan, Inc. v. Secure Computing Corp.*, 626 F.3d 1197, 1207 (Fed. Cir. 2010) ("Unlike *O2 Micro*, where the court failed to resolve the parties' quarrel, the district court rejected Defendants' construction."); *Summit 6, LLC v. Samsung Elecs. Co., Ltd.*, 802 F.3d 1283, 1291 (Fed. Cir. 2015).

The Court accordingly hereby construes these disputed terms as set forth in the following chart:

Term	Construction
"primary synchronization sequence (PSS) carrying partial information of a cell identification"	**"primary synchronization sequence (PSS) carrying a portion of information that identifies a cell"**
"secondary synchronization sequence (SSS) carrying remaining information of the cell identification"	**"secondary synchronization sequence (SSS) carrying the remainder of the information that identifies the cell"**
"a first indicator is identified based on the first primary synchronization sequence"	**Plain meaning**
"a second indicator is identified based on the first secondary synchronization sequence"	**Plain meaning**
"wherein the remaining information of the cell identification is information of a cell group to which the mobile station belongs"	**Plain meaning** (Not indefinite)

"wherein the partial information is information to identify a cell within the cell group"	**Plain meaning** (Not indefinite)

V. CONSTRUCTION OF DISPUTED TERMS IN THE '565, '571, '064, '438, AND '435 PATENTS

The '565 Patent, for example, is titled "Method for Generating Downlink Frame, and Method for Searching Cell" and issued on November 27, 2012. The Abstract of the '565 Patent states:

> The present invention relates to a method of generating a downlink frame. The method of generating the downlink frame includes: generating a first short sequence and a second short sequence indicating cell group information; generating a first scrambling sequence and a second scrambling sequence determined by the primary synchronization signal; generating a third scrambling sequence determined by the first short sequence; scrambling the first short sequence with the first scrambling sequence and scrambling the second short sequence with the second scrambling sequence and the third scrambling sequence; and mapping the secondary synchronization signal that includes the scrambled first short sequence and the scrambled second short sequence to a frequency domain.

Plaintiff submits that "[t]hese patents are related and share substantially similar specifications." Dkt. No. 206 at 12. Defendants likewise state that "[t]he '565, '571, '064, '438, and '435 patents share a largely common specification." Dkt. No. 225 at 14. Plaintiff further submits that all of these patents claim an earliest priority date of July 20, 2007. *Id.* at 12–13.

(B)D. "short sequence"

Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning Alternatively, "binary sequence (or binary code) representing cell group information"	"a binary sequence (or binary code) representing cell group information that has a length corresponding to half the number of sub-carriers allocated to the secondary synchronization channel"

Dkt. No. 176-1 at 37; Dkt. No. 206 at 13; Dkt. No. 225 at 15; Dkt. No. 253 at 9. The parties submit that this term appears in Claim 1 of the '565 Patent, Claims 1 and 5 of the '571 Patent, Claims 1 and 15 of the '064 Patent, and Claims 15 and 16 of the '438 Patent. *Id.*

Shortly before the start of the December 5, 2019 hearing, the Court provided the parties with the following preliminary construction: "binary sequence (or binary code) representing cell group information that has a length corresponding to half the number of sub-carriers allocated to the secondary synchronization channel."

(1) The Parties' Positions

Plaintiff argues that although this disputed term "is defined in the patent specification," "an express definition is unnecessary because the dispute solely concerns defendants' proposal to import into the claims a requirement that a short sequence be exactly the length described in a disclosed embodiment." Dkt. No. 206 at 14. Plaintiff further argues that "defendants cite no evidence that 'short' was intended to distinguish prior art or to otherwise exclude sequences with length different than that of the disclosed embodiment." *Id.*

Defendants respond that whereas "Defendants' construction is based on the express definition recited for this term in the specification," "Plaintiff's construction contradicts this definition in its assertion that a 'short sequence' can be *any* length." Dkt. No. 225 at 15 (emphasis in original). Defendants also submit that Plaintiff "cites no case stating that a term can be disregarded if not used during prosecution to distinguish prior art." *Id.* at 18.

Plaintiff replies: "The word 'short' merely refers to length limitations implied elsewhere in the claims. Indeed, the patentee used 'short' to avoid any potential confusion between the various recited 'short sequences' and 'scrambling sequences.'" Dkt. No. 234 at 6. Plaintiff also argues that the limitation that the short sequences "are included in the secondary synchronization

signal and are alternately disposed on a plurality of sub-carriers" "already means each of the two short sequences occupies half the sub-carriers used by the secondary synchronization signal (SSS)." *Id.* at 7.

(2) Analysis

Claim 1 of the '565 Patent, for example, recites (emphasis added):

> 1. A method of searching a cell by a mobile station, comprising:
> receiving a downlink frame including a primary synchronization signal and a secondary synchronization signal; and
> identifying a cell by using the primary synchronization signal and the secondary synchronization signal, wherein,
> a first *short sequence* scrambled with a first scrambling sequence and a second *short sequence* scrambled with a second scrambling sequence and a third scrambling sequence are included in the secondary synchronization signal and are alternately disposed on a plurality of sub-carriers, and
> the first *short sequence* and the second *short sequence* indicate cell group information, the first scrambling sequence and the second scrambling sequence are determined based on the primary synchronization signal, and the third scrambling sequence is determined based on the first *short sequence*.

Claims 1 and 5 of the '571 Patent, Claims 1 and 15 of the '064 Patent, and Claims 1 and 15 of the '438 Patent are similar as to the recitals of "short sequence."

The specification of the '565 Patent discloses:

> *A short sequence (wn) is a binary sequence (or binary code) representing cell group information.* That is, the short sequence (wn) is the binary sequence allocated to a cell group number and frame synchronization. *Moreover, the length of the short sequence corresponds to half of the number of sub-carriers allocated to the secondary synchronization channel*. In the exemplary embodiment of the present invention, it is described that the number of sub-carriers allocated to the secondary synchronization channel is 62. However, it is not limited thereto. Accordingly, the short sequence length according to the exemplary embodiment of the present invention is 31.

'565 Patent at 7:11–22 (emphasis added). The parties agree that substantially similar disclosures appear in the '571 Patent, the '064 Patent, and the '438 Patent. *See* '571 Patent at 7:59–8:3; *see also* '064 Patent at 7:43–53; '438 Patent at 7:43–53. As to this disclosure of "secondary

synchronization channel," Plaintiff states that "[a]s used in the patent specification, SSC [secondary synchronization channel] refers to the sub-carriers used for the SSS [secondary synchronization signal]." Dkt. No. 234 at 7 n.5.

The disclosure at issue begins by stating what a short sequence "is," and this usage of "is" weighs in favor of finding a lexicography. *See Sinorgchem Co., Shandong v. Int'l Trade Comm'n*, 511 F.3d 1132, 1136 (Fed. Cir. 2007) ("[T]he word 'is' . . . may signify that a patentee is serving as its own lexicographer.") (citation and internal quotation marks omitted); *see also CCS Fitness, Inc. v. Brunswick Corp.*, 288 F.3d 1359, 1366 (Fed. Cir. 2002) ("[T]he claim term will not receive its ordinary meaning if the patentee acted as his own lexicographer and clearly set forth a definition of the disputed claim term in either the specification or prosecution history."). Further, the word "moreover" links the disputed language referring to "the short sequence" to the definitional usage of "is" that refers to "a short sequence." *See id.* at 7:14.

Plaintiff argues that this definition appears in relation to certain "exemplary embodiment[s]." *Id.* at 7:1; *see id.* at 6:66–7:10. Plaintiff cites authority that even if "all of the embodiments discussed in the patent have a [particular feature], . . . it is not proper to import from the patent's written description limitations that are not found in the claims themselves." *Flo Healthcare Sols., LLC v. Kappos*, 697 F.3d 1367, 1375 (Fed. Cir. 2012), *abrogated on other grounds by Williamson v. Citrix Online, LLC*, 792 F.3d 1339, 1349 (Fed. Cir. 2015).

Plaintiff's arguments, however, pertain to portions of the disclosure that expressly refer to "exemplary embodiment[s]." *See id.* at 6:66–7:22. The portion of the disclosure cited by Defendants refers to the term "short sequence" in general rather than with reference to any particular embodiment. Indeed, the references to "exemplary embodiment[s]" contrast with the above-discussed more general statements about what a short sequence "is." *See id.*

Plaintiff also urges that "defendants cite no evidence that 'short' was intended to distinguish prior art or to otherwise exclude sequences with length different than that of the disclosed embodiment." Dkt. No. 206 at 14. Plaintiff cites no legal authority to support this argument, and Plaintiff's position is disfavored by the general proposition that "[a] claim construction that gives meaning to all the terms of the claim is preferred over one that does not do so." *See, e.g., Merck & Co., Inc. v. Teva Pharms. USA, Inc.*, 395 F.3d 1364, 1372 (Fed. Cir. 2005). Plaintiff likewise fails to persuasively support its contention that the word "short" is "merely descriptive." Dkt. No. 206 at 15. Though such arguments might perhaps bear upon whether preamble language is limiting, here the language at issue appears in limitations in the bodies of the claims. Admittedly, "surplusage may exist in some claims." *Decisioning.com, Inc. v. Federated Dep't Stores, Inc.*, 527 F.3d 1300, 1312 n.6 (Fed. Cir. 2008) (citation omitted); *accord ERBE Elektromedizin GmbH v. Canady Tech. LLC*, 629 F.3d 1278, 1286 (Fed. Cir. 2010). Here, however, the following principles articulated by the Federal Circuit apply:

> Allowing a patentee to argue that physical structures and characteristics specifically described in a claim are merely superfluous would render the scope of the patent ambiguous, leaving examiners and the public to guess about which claim language the drafter deems necessary to his claimed invention and which language is merely superfluous, nonlimiting elaboration. For that reason, claims are interpreted with an eye toward giving effect to all terms in the claim.

Bicon, Inc. v. Straumann Co., 441 F.3d 945, 950 (Fed. Cir. 2006).

Plaintiff further argues that the limitation that the short sequences "are included in the secondary synchronization signal and are alternately disposed on a plurality of sub-carriers" "already means each of the two short sequences occupies half the sub-carriers used by the secondary synchronization signal (SSS)." Dkt. No. 234 at 7. Plaintiff argues that "'short' refers simply to the fact that two short sequences are 'included in the secondary synchronization signal.'" Dkt. No. 206 at 15. In other words, Plaintiff argues that the sequences can be no larger than will

fit within the secondary synchronization signal. *See id.* But even assuming that this is a plausible interpretation, where "the specification . . . reveal[s] a special definition given to a claim term by the patentee that differs from the meaning it would otherwise possess . . . , the inventor's lexicography governs." *Phillips*, 415 F.3d at 1316.

Finally, at the December 5, 2019 hearing, Defendants emphasized that nothing in the specification contradicts the lexicography proposed by Defendants. In response, Plaintiff maintained that the "moreover" language in the above-reproduced paragraph is not part of any lexicography, but Plaintiff was unable to cite any disclosure in the specification as purportedly being inconsistent with Defendants' proposal.

Based on all of the foregoing, the Court hereby construes **"short sequence"** to mean **"binary sequence (or binary code) representing cell group information that has a length corresponding to half the number of sub-carriers allocated to the secondary synchronization channel."**

(B)E. "scrambled" and "scrambled with [a scrambling sequence]"

Plaintiff's Proposed Construction	**Defendants' Proposed Construction**
Plain and ordinary meaning. Alternatively, "scrambled with [a scrambling sequence]" means "altered using [a scrambling sequence]"	"multiplied" Alternatively, "scrambled with [a scrambling sequence]" means "multiplied by [a scrambling sequence]"

Dkt. No. 176-1 at 36–37; Dkt. No. 206 at 16; Dkt. No. 253 at 10; *see* Dkt. No. 225 at 19. The parties submit that this term appears in Claim 1 of the '565 Patent, Claims 1 and 5 of the '571 Patent, Claims 1, 5, and 15 of the '064 Patent, Claim 15 of the '438 Patent, and Claim 1 of the '435 Patent. *Id.*

Shortly before the start of the December 5, 2019 hearing, the Court provided the parties with the following preliminary constructions:

Term	Preliminary Construction
"scrambled with [a scrambling sequence]"	"altered by applying [a scrambling sequence]"
"scrambled"	No construction necessary apart from construction of the larger term "scrambled with [a scrambling sequence]"

(1) The Parties' Positions

Plaintiff argues that Defendants' proposal improperly limits "scrambling" to an operation that is purportedly disclosed as part of a particular embodiment. Dkt. No. 206 at 17. Plaintiff also submits that "a person of ordinary skill would understand that the description of a scrambling operation will depend on what mathematical notation is being used." *Id.*

Defendants respond that "[b]eginning with the original Korean provisional language, the applicants, by clear and unmistakable statements, limited their invention to multiplying by a scrambling sequence." Dkt. No. 225 at 19. Defendants argue that Plaintiff "cannot simultaneously claim priority to an application and disavow its disclosure." *Id.* at 21. Further, Defendants submit: "Despite [Plaintiff's] assertion that there are myriad 'logically equivalent' ways to scramble one sequence with another (Dkt. No. 206 at 17), the six Korean provisional applications and five patents at issue here only disclose, imply, or suggest a single scrambling method: element-wise multiplication by a scrambling sequence, and state that this is the method 'of the present invention.'" Dkt. No. 225 at 21 (citation omitted). Finally, as to the opinions of Plaintiff's expert, Defendants argue that "even if allowed, Dr. Wells' rebuttal declaration should be disregarded as not credible and unreliable." *Id.* at 22. Finally, as to Plaintiff's alternative proposal, Defendants

submit that "[t]he term 'altered' appears nowhere in the patents, and [Plaintiff's] extrinsic evidence consists of nothing more than Dr. Wells' unsupported assertions." *Id.* at 24.

Plaintiff replies that "[u]nable to refute the undisputed meaning of 'scrambled' in the applicable field, [D]efendants allege one sentence in a foreign priority application acts as a disclaimer," and "the language defendants point to does not come close to being an 'unmistakable disclaimer' of the scope of the term 'scrambled.'" Dkt. No. 234 at 9.

(2) Analysis

Claim 1 of the '565 Patent, for example, recites (emphasis added):

> 1. A method of searching a cell by a mobile station, comprising:
> receiving a downlink frame including a primary synchronization signal and a secondary synchronization signal; and
> identifying a cell by using the primary synchronization signal and the secondary synchronization signal, wherein,
> a first short sequence *scrambled with a first scrambling sequence* and a second short sequence *scrambled with a second scrambling sequence* and a third scrambling sequence are included in the secondary synchronization signal and are alternately disposed on a plurality of sub-carriers, and
> the first short sequence and the second short sequence indicate cell group information, the first scrambling sequence and the second scrambling sequence are determined based on the primary synchronization signal, and the third scrambling sequence is determined based on the first short sequence.

The specification discloses:

> According to the above-mentioned present invention, *interference between sectors can be reduced by scrambling* the short sequences due to the scrambling sequences, thereby improving performance for searching cells.

'565 Patent at 3:40–43 (emphasis added). The patents-in-suit thus refer to "scrambling" in the context of reducing interference between cells.

Defendants argue that "the six Korean provisional applications and five patents at issue here only disclose, imply, or suggest a single scrambling method: element-wise multiplication by a scrambling sequence, and state that this is the method 'of the present invention.'" Dkt. No. 225

at 21. Defendants submit a certified translation of a Korean patent application, which includes the following:

> [A] method of *applying the scrambling code* to obtain the cell ID group efficiently by averaging the inter-sector interference is provided.
>
> * * *
>
> However, as mentioned above, the number of codes generated by combining two binary codes is 961, which is sufficiently larger than 170 or 340 required. Still, since 961 codes are produced by a combination of short codes having 31 code lengths, the short codes in the combination code can be the same even if the combination code number is different. This is one of the factors for reducing cell search performance by giving inter-sector interference. In addition, since the mobile station receives a synchronization channel and performs cell search, it is necessary to reduce the PAPR [(peak-to-average power ratio)] when transmitting data in a cell (or sector). As shown in FIG. 4, in order to solve these two problems, *the present invention proposes a method of multiplying* the above-mentioned upper / lower binary codes by the scrambling code as follows.

Dkt. No. 225-4, July 20, 2007 Korean Patent Application No. 10-2007-0072837 at ¶¶ 3 & 22 (emphasis added); *see id.* at ¶¶ 23–27 & 32–35.

The patents-in-suit incorporate-by-reference this Korean patent application. *See* '565 Patent at 1:8–16 ("the entire contents of which are incorporated herein by reference"); *see also* '571 Patent at 1:8–16; '064 Patent at 1:7–17; '438 Patent at 1:7–19; '435 Patent at 1:7–21. Also of note, Plaintiff claims priority to the July 20, 2007 Korean provisional patent application filing date. *See* Dkt. No. 225-3, Plaintiff's First Amended Infringement Disclosures at 12.

Defendants urge that "[w]hen a patent thus describes the features of the 'present invention' as a whole, this description limits the scope of the invention." *Verizon*, 503 F.3d at 1308; *see Pacing Techs.*, 778 F.3d at 1024–25 (collecting cases); *see also Regents of Univ. of Minn. v. AGA Med. Corp.*, 717 F.3d 929, 936 (Fed. Cir. 2013).

Although this passage refers to "the present invention," the qualification that this is what the present invention "proposes" weighs against finding any clear and unmistakable disclaimer.

See Massachusetts Inst. of Tech. v. Shire Pharm., Inc., 839 F.3d 1111, 1119 (Fed. Cir. 2016) ("The party seeking to invoke prosecution history disclaimer bears the burden of proving the existence of a 'clear and unmistakable' disclaimer that would have been evident to one skilled in the art.") (citation and quotation marks omitted); *see also Omega Eng'g, Inc, v. Raytek Corp.*, 334 F.3d 1314, 1325 (Fed. Cir. 2003) ("To balance the importance of public notice and the right of patentees to seek broad patent coverage, we have thus consistently rejected prosecution statements too vague or ambiguous to qualify as a disavowal of claim scope."). Further, Defendants' reliance on the word "multiplying" in a translation of the foreign application is troubling because "multiplying" appears nowhere in the claims or the specifications of the patents here at issue (other than in material incorporated by reference, as above). Instead, the claims recite merely "scrambled," which, as noted above, refers to a particular technique for reducing interference. '565 Patent 3:40–43.

Further, Plaintiff's expert opines that "scrambling" is a well-known term in the relevant art and refers generically to altering a signal in a controlled manner for some desired purpose. Dkt. No. 208-1, Sept. 11, 2019 Wells Decl. at ¶ 136. Defendants' expert offers no opinion on whether "scrambling" has a well-known meaning in the relevant art. *See* Dkt. No. 208-3, Sept. 11, 2019 Haimovich Decl. at ¶¶ 46–55. Defendants' expert relies instead on purported limiting statements in the intrinsic record. *See id.*

Defendants submit that "[t]he issued patents also universally refer to the output of the 'scrambling' operation as a 'product,' consistent with the description of a multiplication operation, rather than an addition or XOR operation." Dkt. No. 225 at 21. The specifications indeed refer to a "product" of a sequence and a scrambling sequence. *See, e.g.*, '565 Patent at 8:31–38 ("each element of a first sequence c_0, according to the second method of generating the secondary

synchronization signal is a product of each element of the first short sequence w0 and each element of the scrambling sequence $P_{j,o,1}$ corresponding thereto"), 9:26–33, 9:45–52 & 10:34–42.

Defendants submit multiple technical dictionary definitions that refer to the result of a multiplication operation as a "product" (as opposed to the result of an addition operation, which is referred to as a "sum"). *See* Dkt. No. 225-7, *IBM Dictionary of Computing* 534, 661 (1994); *see also* Dkt. No. 225-8, *The New IEEE Standard Dictionary of Electrical and Electronics Terms* 1011, 1308 (5th ed. 1993); Dkt. No. 225-9, *Chambers Dictionary of Science and Technology* 918 (1999) ("product (*Maths*) See multiplication").

On balance, however, interpreting "scrambled" in this manner would improperly import a limitation from particular disclosed embodiments, particularly in the absence of any clear and unmistakable disclaimer. *See Phillips*, 415 F.3d at 1323; *see, e.g., Omega Eng'g*, 334 F.3d at 1325. The Court therefore rejects Defendants' proposed interpretation.

Nonetheless, "some construction of the disputed claim language will assist the jury to understand the claims." *TQP*, 2012 WL 1940849, at *2. Plaintiff proposes that "scrambled with [a scrambling sequence]" means "altered using [a scrambling sequence]." Defendants' expert opines that Plaintiff's alternative proposal should be rejected because: "A scrambling element of '1' would not change or alter any element of a short sequence it multiplied. Therefore, at most, only some elements of a binary short sequence will be changed or 'altered' when multiplied by a binary scrambling sequence." Dkt. No. 208-3, Sept. 11, 2019 Haimovich Decl. at ¶ 55; *see id.* at ¶ 54. Because the Court rejects Defendants' proposal of requiring multiplying, Defendants' arguments as to Plaintiff's alternative proposed construction are unavailing. Still, Plaintiff's proposal of "using" is potentially unclear. Instead, "by applying" will better convey the manner

in which the scrambling sequence must be utilized. At the December 5, 2019 hearing, Plaintiff was amenable to the Court's preliminary constructions (set forth above).

Finally, all of the claims of the relevant patents use the word "scrambled" as part of a larger "scrambled with [a scrambling sequence]" term. *See* '565 Patent, Cl. 1; *see also* '571 Patent, Cls. 1 & 5; '064 Patent, Cls. 1, 5 & 15; '438 Patent, Cl. 15; '435 Patent, Cl. 1. The term "scrambled" therefore need not be construed apart from construction of "scrambled with [a scrambling sequence]."

The Court accordingly hereby construes these disputed terms as set forth in the following chart:

Term	Construction
"scrambled with [a scrambling sequence]"	**"altered by applying [a scrambling sequence]"**
"scrambled"	**No construction necessary apart from construction of the larger term "scrambled with [a scrambling sequence]"**

VI. CONCLUSION

The Court adopts the constructions set forth in this opinion for the disputed terms of the patents-in-suit. The parties are ordered to not refer to each other's claim construction positions in the presence of the jury. Likewise, in the presence of the jury, the parties are ordered to refrain from mentioning any portion of this opinion, other than the actual definitions adopted by the Court. The Court's reasoning in this order binds the testimony of any witnesses, and any reference to the claim construction proceedings is limited to informing the jury of the definitions adopted by the Court.

SIGNED this 16th day of December, 2019.

ROY S. PAYNE
UNITED STATES MAGISTRATE JUDGE